

## CLAIMS

1. A self-cleaning catalytic chemical vapor deposition apparatus which forms a thin film by using the catalytic action of a catalytic body which is resistance heated within a  
5 reaction chamber capable of being evacuated to a vacuum, characterized in that the apparatus comprises a power supply to apply a bias voltage to the catalytic body and a changeover switch which changes the polarity of the bias voltage to be applied, and which removes an adhering film which has adhered  
10 to the interior of the reaction chamber without etching the catalytic body itself on the basis of a radical species generated when an introduced cleaning gas comes into contact with the resistance heated catalytic body and is decomposed, the bias voltage applied to the catalytic body, and a polarity  
15 of the bias voltage.

2. The self-cleaning catalytic chemical vapor deposition apparatus according to claim 1, characterized in that in addition to the aforementioned constitution, a radical species  
20 generator which decomposes the cleaning gas into a radical species and introduces the radical species into the reaction chamber is provided.

3. The self-cleaning catalytic chemical vapor deposition  
25 apparatus according to claim 1, characterized in that the cleaning gas is a mixed gas of a halogen-containing gas and either an inert gas or a reducing gas.

4. The self-cleaning catalytic chemical vapor deposition apparatus according to claim 1, characterized in that the cleaning gas contains either an inert gas or a reducing gas and that a polarity of the bias voltage based on the kind of the inert gas and the reducing gas is obtained.

5. The self-cleaning catalytic chemical vapor deposition apparatus according to claim 1, characterized in that the cleaning gas is a mixed gas of a halogen-containing gas and a reducing gas when the bias voltage of the prescribed polarity is zero.

6. The self-cleaning catalytic chemical vapor deposition apparatus according to claim 3, 4 or 5 characterized in that the halogen-containing gas is any of gases selected from the group consisting of  $\text{NF}_3$ ,  $\text{HF}$ ,  $\text{C}_2\text{F}_6$ ,  $\text{C}_3\text{F}_8$ ,  $\text{SF}_6$ ,  $\text{CF}_4$ ,  $\text{CClF}_3$ ,  $\text{C}_2\text{ClF}_5$  and  $\text{CCl}_4$  or combinations of the gases, that the reducing gas is  $\text{H}_2$ , and that the inert gas is a noble gas.

7. The self-cleaning catalytic chemical vapor deposition apparatus according to claim 1, characterized in that the cleaning gas is a mixed gas of a halogen-containing gas and  $\text{H}_2$  and that the bias voltage of a positive polarity is applied.

8. The self-cleaning catalytic chemical vapor deposition apparatus according to claim 1, characterized in that the

cleaning gas is a mixed gas of a halogen-containing gas and Ar and that the bias voltage of a negative polarity is applied.

9. The self-cleaning catalytic chemical vapor deposition

5 apparatus according to claim 1, characterized in that there is provided a monitoring device which detects the occurrence of etching of the catalytic body itself on the basis of electric resistance of the catalytic body.

10 10. A cleaning method of a catalytic chemical vapor deposition apparatus which forms a thin film by using the catalytic action of a catalytic body which is resistance heated within a reaction chamber capable of being evacuated to a vacuum, the cleaning method comprising a step of applying a bias voltage  
15 of a prescribed polarity to a catalytic body which is resistance heated, a step of introducing a cleaning gas; a step in which the cleaning gas comes into contact with the catalytic body which has been resistance heated and is decomposed to generate a radical species, and a step of  
20 removing an adhering film which has adhered to the interior of a reaction chamber without etching the catalytic body itself.

11. The cleaning method of a catalytic chemical vapor deposition apparatus according to claim 10, characterized in  
25 that the step of introducing a cleaning gas is a step of decomposing the cleaning gas into a radical species and introducing the radical species into the reaction chamber.

12. The cleaning method of a catalytic chemical vapor deposition apparatus according to claim 10, characterized in that the cleaning gas is a mixed gas of a halogen-containing  
5 gas and either an inert gas or a reducing gas.

13. The cleaning method of a catalytic chemical vapor deposition apparatus according to claim 10, characterized in that the cleaning gas contains either an inert gas or a  
10 reducing gas and that a bias voltage of a polarity determined on the basis of the kind of the inert gas and the reducing gas is applied.

14. The cleaning method of a catalytic chemical vapor  
15 deposition apparatus according to claim 10, characterized in that the cleaning gas is a mixed gas of a halogen-containing gas and a reducing gas when the bias voltage of the prescribed polarity is zero.

20 15. The cleaning method of a catalytic chemical vapor deposition apparatus according to claim 12, 13 or 14, characterized in that the halogen-containing gas is any of gases selected from the group consisting of  $\text{NF}_3$ ,  $\text{HF}$ ,  $\text{C}_2\text{F}_6$ ,  $\text{C}_3\text{F}_8$ ,  $\text{SF}_6$ ,  $\text{CF}_4$ ,  $\text{CClF}_3$ ,  $\text{C}_2\text{ClF}_5$  and  $\text{CCl}_4$  or combinations of the gases,  
25 that the reducing gas is  $\text{H}_2$ , and that the inert gas is a noble gas.

16. The cleaning method of a self-cleaning catalytic chemical vapor deposition apparatus according to claim 10, characterized in that the cleaning gas is a mixed gas of a halogen-containing gas and  $H_2$  and that the bias voltage of a positive polarity is applied.

17. The cleaning method of a catalytic chemical vapor deposition apparatus according to claim 10, characterized in that the cleaning gas is a mixed gas of a halogen-containing gas and Ar and that the bias voltage of a negative polarity is applied.

18. The cleaning method of a catalytic chemical vapor deposition apparatus according to claim 10, characterized in that in addition to the aforementioned constitution, the occurrence of etching of the catalytic body itself is monitored in situ on the basis of electric resistance during cleaning.